

What is claimed is:

1. An electrolysis apparatus comprising a plurality of anodes, each anode having a lower portion immersed in a molten electrolyte bath, wherein a solid material selected from the group consisting of alumina and cryolite, and mixtures thereof, together with an effective amount of cementitious binder, said solid material contacting and circumscribing at least an upper portion of at least one of said anodes.
2. The electrolysis apparatus of Claim 1, wherein the anodes are inert anodes.
3. The electrolysis apparatus of Claim 1 wherein the electrolysis apparatus is an electrolytic cell used in the production of aluminum.
4. The electrolysis apparatus of Claim 1 also containing a top metal plate.
5. The electrolysis apparatus of Claim 1 where the solid material comprises from about 40 wt.% to about 80 wt.% cryolite, about 2 wt.% to about 25 wt.% alumina and from about 5 wt.% to about 25 wt.% of cementitious binder material.

6. The electrolysis apparatus of Claim 1, wherein the solid material comprises alumina containing from 5 wt.% to 15 wt.% of cementitious binder material.
7. The electrolysis apparatus of Claim 1, wherein the solid material will dissolve at temperatures of about 1000°C in the presence of a cryolite-based molten electrolyte bath.
8. The electrolysis apparatus of Claim 1, wherein the solid material will dissolve to the extent where the remaining solid material thickness is from 30% to 80% of the original thickness.
9. The electrolysis apparatus of Claim 1, wherein the entire at least one anode is circumscribed by the solid material.
10. An electrolysis apparatus comprising an inert anode system comprising at least one inert anode having a lower portion in contact with a molten salt bath, where at least an upper portion of the inert anode contacts and is circumscribed by a solid material subject to attack by gases from the bath, wherein the solid material is selected from the group consisting of alumina-based cement and cryolite-alumina, both of which will dissolve in the presence of the molten salt bath.

11. The electrolysis apparatus of Claim 10 where the solid material is about 40 wt.% to 80 wt.% cryolite, about 2 wt.% to 25 wt.% alumina, and 5 wt.% to 25 wt.% of a cementitious material.
12. The electrolysis apparatus of Claim 10, wherein the electrolysis apparatus is an electrolytic cell suitable for production of aluminum.
13. The electrolysis apparatus of Claim 10, wherein the solid material will dissolve to the extent that the remaining solid material thickness is from 30% to 80% of the original thickness.
14. The electrolysis apparatus of Claim 10, wherein the solid material will dissolve to the extent that the remaining solid material thickness is from 40% to 70% of the original support thickness.
15. The electrolysis apparatus of Claim 10, wherein the cement material is an alumina based refractory cement.
16. The electrolysis apparatus of Claim 10, wherein the entire at least one inert anode is circumscribed by the solid material.

17. The electrolysis apparatus of Claim 10, where the solid material is applied by casting.

18. The electrolysis apparatus of Claim 10, where the solid material is applied by spraying.

19. The electrolysis apparatus of Claim 10, where the solid material is applied by dipping.